

B1
end

wavelength to incident light of a center wavelength within a visible region and has a movable electrode portion on a lower surface thereof. The lower optical phase difference film serves to give a phase delay of a $1/4$ wavelength to the incident light of the center wavelength within the visible region and has a stationary electrode portion on an upper surface thereof. A lower polarizer is disposed on a lower surface of the liquid crystal display. An angle formed by an optical axis of the upper optical phase difference film and a polarization axis of the upper polarizer is about 45° . An angle formed by an optical axis of the lower optical phase difference film and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display is about 45° . An angle formed by the optical axis of the upper optical phase difference film and the optical axis of the lower optical phase difference film is about 90° . An angle formed by the polarization axis of the upper polarizer and linearly polarized light that is to be outputted from the device surface out of linearly polarized light emitted from the liquid crystal display is 90° .

Please replace the paragraph beginning at page 5, line 7, with the following rewritten paragraph:

B2

According to a third aspect of the present invention, there is provided a touch-input type liquid crystal display device according to the first aspect, wherein a glass substrate having optical isotropy is disposed between the stationary electrode portion and the lower optical phase difference film. The stationary electrode portion in the third aspect is formed directly on the glass substrate having optical isotropy.

Please replace the paragraph beginning at page 5, line 15, with the following rewritten paragraph:

B3

According to a fourth aspect of the present invention, there is provided a touch-input type liquid crystal display device according to the first aspect, wherein an optically isotropic film is disposed between the stationary electrode portion and the lower optical phase difference film. The stationary electrode portion in the fourth aspect is formed directly on the optically isotropic film.

Please replace the paragraph beginning at page 7, line 24, with the following rewritten paragraph:

b4
According to a 14th aspect of the present invention, there is provided a touch-input type liquid crystal display device according to any one of the first to 13th aspects, wherein either one of a member on which the stationary electrode portion has been directly formed and the liquid crystal display. Further in accordance with the 14th aspect of the present invention, all of the stationary electrode portion-directly-formed member and the liquid crystal display and a member disposed between the stationary electrode portion-directly-formed member and the liquid crystal display are adhesively bonded overall by a transparent adhesive layer or a transparent re-peel sheet.

Please replace the paragraph beginning at page 9, line 9, with the following rewritten paragraphs:

b5
According to a 19th aspect of the present invention, there is provided a method for fabricating a touch-input type liquid crystal display device having a liquid crystal display below a touch panel, wherein in the liquid crystal display device, an upper polarizer is disposed on an upper surface of a transparent touch panel in which an upper optical phase difference film and a lower optical phase difference film are disposed with a space layer interposed therebetween, the upper optical phase difference film serving to give a phase delay of a $1/4$ wavelength to incident light of a center wavelength within a visible region and having a movable electrode portion on a lower surface thereof, and the lower optical phase difference film serving to give a phase delay of a $1/4$ wavelength to the incident light of the center wavelength within the visible region and having a stationary electrode portion on an upper surface thereof; and a lower polarizer is disposed on a lower surface of the liquid crystal display; wherein an angle formed by an optical axis of the upper optical phase difference film and a polarization axis of the upper polarizer is about 45° , an angle formed by an optical axis of the lower optical phase difference film and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display is about 45° , an angle formed by the optical axis of the upper optical phase difference film and the optical axis of the lower optical phase difference film is about 90° , and wherein an angle formed by the a polarization axis of the

upper polarizer and linearly polarized light that is to be outputted from the device surface out of linearly polarized light emitted from the liquid crystal display is 90°.

BS
en
The method in accordance with the 19th aspect of the present invention comprises obtaining a movable-side sheet by, after performing a heat treatment for removal of residual solvents in film material of the upper optical phase difference film, forming a transparent electrically conductive film for the movable electrode portion directly on the film material. After performing a heat treatment for reducing dimensional errors involved in formation of leads, the method includes forming leads of the movable electrode portion, and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink.

The method in accordance with the 19th aspect further includes obtaining a stationary-side sheet by, after performing a heat treatment for removal of residual solvents in film material of the lower optical phase difference film, forming a transparent electrically conductive film for the stationary electrode portion directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the stationary electrode portion, and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink.

The method in accordance with the 19th aspect still further includes laminating together the movable-side sheet and the stationary-side sheet, then laminating the upper polarizer on an upper surface of the upper optical phase difference film of the movable-side sheet and thereafter performing a pressure degassing process. The method finally includes laminating together the stationary-side sheet with the liquid crystal display.

Please replace the paragraph beginning at page 11, line 22, with the following rewritten paragraphs:

BC
According to a 20th aspect of the present invention, there is provided a method for fabricating a touch-input type liquid crystal display device having a liquid crystal display below a touch panel, wherein in the liquid crystal display device, an upper polarizer is disposed on an upper surface of a transparent touch panel in which an upper optical phase difference film and a lower optical phase

bb
cm

difference film are disposed with a space layer interposed therebetween, the upper optical phase difference film serving to give a phase delay of a $1/4$ wavelength to incident light of a center wavelength within a visible region and having a movable electrode portion on a lower surface thereof, and the lower optical phase difference film serving to give a phase delay of a $1/4$ wavelength to the incident light of the center wavelength within the visible region and having a stationary electrode portion on an upper surface thereof; and a lower polarizer is disposed on a lower surface of the liquid crystal display, wherein an angle formed by an optical axis of the upper optical phase difference film and a polarization axis of the upper polarizer is about 45° , an angle formed by an optical axis of the lower optical phase difference film and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display is about 45° , an angle formed by the optical axis of the upper optical phase difference film and the optical axis of the lower optical phase difference film is about 90° , and wherein an angle formed by the polarization axis of the upper polarizer and linearly polarized light that is to be outputted from the device surface out of linearly polarized light emitted from the liquid crystal display is 90° .

The method in accordance with the 20th aspect of the present invention comprises obtaining a movable-side sheet by, after performing a heat treatment for removal of residual solvents in film material of the upper optical phase difference film, forming a transparent electrically conductive film for the movable electrode portion directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the movable electrode portion, and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink.

The method in accordance with the 20th aspect of the present invention additionally comprises obtaining a stationary-side sheet by forming a transparent electrically conductive film for the stationary electrode portion directly on a glass substrate having optical isotropy, forming leads of the stationary electrode portion, and performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink.

The method in accordance with the 20th aspect of the present invention further comprises laminating together the movable-side sheet and the stationary-side sheet, and then, laminating the

b6
enc/ upper polarizer on an upper surface of the upper optical phase difference film of the movable-side sheet and thereafter performing a pressure degassing process.

The method in accordance with the 20th aspect of the present invention finally includes laminating together the stationary-side sheet with the liquid crystal display with the lower optical phase difference film interposed therebetween.

Please replace the paragraph beginning at page 14, line 7, with the following rewritten paragraphs:

b7
According to a 21st aspect of the present invention, there is provided a method for fabricating a touch-input type liquid crystal display device having a liquid crystal display below a touch panel, wherein in the liquid crystal display device, an upper polarizer is disposed on an upper surface of a transparent touch panel in which an upper optical phase difference film and a lower optical phase difference film are disposed with a space layer interposed therebetween, the upper optical phase difference film serving to give a phase delay of a $1/4$ wavelength to incident light of a center wavelength within a visible region and having a movable electrode portion on a lower surface thereof, and the lower optical phase difference film serving to give a phase delay of a $1/4$ wavelength to the incident light of the center wavelength within the visible region and having a stationary electrode portion on an upper surface thereof; and a lower polarizer is disposed on a lower surface of the liquid crystal display, wherein an angle formed by an optical axis of the upper optical phase difference film and a polarization axis of the upper polarizer is about 45° , an angle formed by an optical axis of the lower optical phase difference film and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display is about 45° , an angle formed by the optical axis of the upper optical phase difference film and the optical axis of the lower optical phase difference film is about 90° , and wherein an angle formed by the a polarization axis of the upper polarizer and linearly polarized light that is to be outputted from the device surface out of linearly polarized light emitted from the liquid crystal display is 90° .

The method in accordance with the 21st aspect of the present invention comprises obtaining a movable-side sheet by, after performing a heat treatment for removal of residual solvents in film

B1
end
material of the upper optical phase difference film, forming a transparent electrically conductive film for the movable electrode portion directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the movable electrode portion, and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink.

The method in accordance with the 21st aspect of the present invention further comprises obtaining a stationary-side sheet by, after performing a heat treatment for removal of residual solvents in film material of an optically isotropic film, forming a transparent electrically conductive film for the stationary electrode portion directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the stationary electrode portion, and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink.

The method in accordance with the 21st aspect of the present invention still further comprises laminating together the movable-side sheet and the stationary-side sheet, laminating the upper polarizer on an upper surface of the upper optical phase difference film of the movable-side sheet and thereafter performing a pressure degassing process and laminating together the stationary-side sheet with the liquid crystal display with the lower optical phase difference film interposed therebetween.

Please replace the paragraph beginning at page 18, line 14, with the following rewritten paragraph:

B8
That is, by the arrangement that the angle formed by the polarization axis of the upper polarizer and the optical axis of the upper optical phase difference film is set to about 45° , light enters the space layer of the transparent touch panel in the form of circularly polarized light or generally circularly polarized light, and reflected circularly polarized light or generally circularly polarized light passes through the upper optical phase difference film again, resulting in linearly polarized light vertical to the transmission axis of the upper polarizer, so that reflected light is suppressed. The term, polarization axis (or absorption axis) of the upper polarizer, refers to an axis parallel to the drawing direction of the film material. Light passing through the upper polarizer is polarized, going out from

B8
end

the upper polarizer as linearly polarized light only in a direction perpendicular to the absorption axis. It is noted that an axis perpendicular to the absorption axis is referred to as a transmission axis. In order to allow the linearly polarized light to be transmitted through this upper polarizer, the transmission axis and the direction of the linearly polarized light must be coincident with each other. Linearly polarized light out of coincidence is inhibited from being transmitted by the upper polarizer.

Please replace the paragraph beginning at page 20, line 10, with the following rewritten paragraph:

B9

As a result of these improvements, the liquid crystal display equipped with the transparent touch panel according to the present invention can offer a display screen which reflects less in a room with fluorescent lamps or the like or in outdoor places, is high in contrast, and has very good visibility.

Please replace the paragraph beginning at page 28, line 13, with the following rewritten paragraph:

B10

The upper optical phase difference film 4 also fulfills a function as a pen or finger input of the touch panel, and so it needs to have flexibility for easier input operation.

Please replace the paragraph beginning at page 29, line 23, with the following rewritten paragraph:

B11

The reason a film material having a 150°C or more thermal deformation temperature is used as the film material for the upper optical phase difference film 4 is described below.

Please replace the paragraph beginning at page 44, line 21, with the following rewritten paragraph:

B12

Even if the polarization axis of the upper polarizer 8 is not accurately at the angle of 45° with respect to the optical axis of the upper optical phase difference film 4, but only if the difference is within $\pm 3^\circ$, then the result is almost the same as with the circularly polarized light (i.e., generally

biz
and
circularly polarized light) and the reflected light outputted from the upper surface of the upper polarizer 8 (top surface of the liquid crystal display device) can be finally neglected.

Please replace the paragraph beginning at page 46, line 5, with the following rewritten paragraph:

B73
By arranging the transparent touch panel 1 and the upper polarizer 8 in such a constitution as shown above, reflected light due to the externally incident light can be suppressed in the following manner.

Please replace the paragraph beginning at page 54, line 18, with the following rewritten paragraph:

B73
Also, the members bonded to each other by the transparent re-peel sheet are characterized by being highly resistant to a vertically-acting pull-away force and a horizontally-displacing force, and easily being separated away from each other when pulled away from both sides in such a manner that the members are peeled off from their ends. Accordingly, there is no expectation of peels during use of the members after the mounting, so that the members can easily be peeled off for maintenance or other occasions. In addition, it is needless to say that the adhesive power of the transparent re-peel sheet does not lower even after repeated removals. Also, in the case where an urethane base polymeric adhesive is used, because the transparent re-peel sheet is a material having both water absorbing and gas sucking properties, the transparent re-peel sheet, when fitted, absorbs the air bubbles mixed between the members at room temperature, so that a product free from air bubbles can finally be obtained without any special treatment. In addition, the terms, any special treatment, refer to such treatment as expelling air bubbles by moving a roll while a pressure is applied from an end portion of the surface of the transparent touch panel 1. Such a special treatment cannot be applied in the case of a transparent touch panel 1 using the glass substrate 11 having optical isotropy, in which case the aforementioned air bubble absorbing effect at room temperature is quite useful.

Please replace the paragraph beginning at page 56, line 16, with the following rewritten paragraph:

BS
A transparent conductive film forming part of the movable electrode portion 3 is formed on the rolled film material for use of the upper optical phase difference film 4. Processing of this film formation may be performed via sputtering, evaporation, or a CVD process. Before the formation of the transparent conductive film, high temperature treatment needs to be carried out as much as possible in order to remove the residual solvents in the film material. This is because the residual solvents, if present, would make it impossible to form a stable transparent conductive film. Whereas the transparent conductive film is deposited after the removal of residual solvents, it is necessary to form the film under a temperature of 150°C or more for stabler formation and higher strength of the transparent conductive film. Accordingly, a film material having a thermal deformation temperature of less than 150°C would yield such deteriorations as deformation and distortion with 150°C or more heat, so that the 1/4 wavelength phase difference could not be retained. Also, heat treatment of less than 150°C would result in insufficient removal of the residual solvents, so that a stable, high-strength transparent conductive film could not be obtained. Therefore, since 150°C or more heat treatment is done for the removal of residual solvents in the film material, the film material for forming the transparent conductive film must be a film material having a thermal deformation temperature of 150°C or more.

Please replace the paragraph beginning at page 58, line 2, with the following rewritten paragraph:

B17
The cut film material sheet is subjected to a heating process, as required, to reduce any dimensional errors in circuit formation. The heating process is desirably done at a temperature of not less than 100°C and less than 130°C for about 1 hour. Thereafter, the circuit formation of leads and the like which are parts of the rest of the movable electrode portion 3 is carried out. The process for the circuit formation may be done by screen printing, offset printing, roll coater, dispenser, or the like. As the ink used for the circuit formation, ink in which metal microparticles having electrical conductivity have been dispersed in a binder made of thermosetting resin is used, and a solvent is

B17
end

added thereto for better printability so that the viscosity is adjusted. As the metal microparticles used for the conductive ink, silver, nickel, copper, gold, or the like is used. High temperature drying process is performed for the curing of the binder and the removal of solvents. The drying process is done at a temperature of not less than 100°C and less than 150°C for 30 - 60 minutes. Drying conditions are adjusted according to the ink used. Needless to say, a film material whose phase difference of 1/4 wavelength is not changed by the heat treatment during the circuit formation is previously selected.

Please replace the paragraph beginning at page 61, line 4, with the following rewritten paragraph:

B18

Further, during the circuit formation, it is also necessary to keep the transparent conductive film and the leads or the like from unnecessary contact (i.e., unnecessary overlaps). Normally, before the circuit formation, the transparent conductive film is preparatorily patterned into a specified configuration. The patterning process may be a print resist process, or photolithography process, or directly pattern printing of the transparent conductive film.

Please replace the paragraph beginning at page 63, line 10, with the following rewritten paragraph:

B19

Also, in order to ensure the insulation between the transparent conductive film of the movable electrode portion 3 and the transparent conductive film of the stationary electrode portion 5 in the touch panel 1, and to enable smoother ON/OFF switching of conduction at operations of pressing or releasing the top surface of the touch panel 1 by pen or finger or the like, a multiplicity of spacers 10 are formed between the transparent conductive film of the movable electrode portion 3 and the transparent conductive film of the stationary electrode portion 5. The surface on which the spacers 10 are formed is given by an electrode surface of the transparent conductive film on at least either one of the stationary electrode portion side and the movable electrode portion side. Process for forming the spacers 10 may be screen printing, offset printing, dispenser process, or the like, by which the spacers 10 of any arbitrary configuration are formed directly. Also usable are a photolithography